

CLAIMS**What is claimed is:**

- 1 1. A process for preparing macrostructures comprised of a crystalline
2 molecular sieve composition, comprising the steps of:
3 (a) forming a composite material composed of a porous organic ion
4 exchanger having a three-dimensional pore structure and a
5 continuous matrix of a mesoporous inorganic material within the
6 three-dimensional pore structure of the porous organic ion
7 exchanger; and
8 (b) removing the porous organic ion exchanger from the composite
9 material to yield the macrostructures
10 (c) treating said continuous three-dimensional matrix of mesoporous
11 inorganic material, before or after removal of said porous organic
12 ion exchanger from the composite material, under hydrothermal
13 conditions to convert at least a portion of said mesoporous
14 inorganic material to a crystalline molecular sieve composition.
- 1 2. The process recited in Claim 1, wherein the step of treating said
2 continuous three-dimensional matrix of mesoporous inorganic material
3 under hydrothermal conditions is conducted in the presence of a
4 structuring agent to convert at least a portion of said mesoporous inorganic
5 material to a crystalline molecular sieve composition.
- 1 3. The process recited in Claim 1, wherein the step of treating under
2 hydrothermal conditions occurs before the step of removing the porous
3 organic ion exchanger from the composite material.

- 1 4. The process recited in Claim 1, wherein the step of treating under
2 hydrothermal conditions occurs after the step of removing the porous ion
3 organic exchanger from the composite material.

- 1 5. The process recited in Claim 1, wherein said macrostructures have a size
2 and shape of the three-dimensional pore structure of said porous organic
3 ion exchanger.

- 1 6. The process recited in Claim 5, wherein said porous organic ion exchanger
2 is a porous organic anionic ion exchanger.

- 1 7. The process recited in Claim 6, wherein said porous anionic ion-exchanger
2 has an ion-exchange capacity greater than about 1 meg./gm of dry weight
3 of porous anionic ion-exchanger.

- 1 8. The process recited in Claim 7, wherein said porous anionic ion-exchanger
2 is a strongly basic anion-exchange resin containing quaternary ammonium
3 groups.

- 1 9. The process recited in Claim 8, wherein said porous organic ion exchanger
2 is a polymer-based organic ion exchanger.

- 1 10. The process recited in Claim 1, wherein said porous organic ion exchanger
2 is a macroreticular ionic exchanger.

- 1 11. The process recited in Claim 1, wherein said macrostructures have at least
2 one dimension greater than about 0.1 mm.

- A 1 12. The process recited in Claim 1, wherein said macrostructures are spherical
2 or cylindrical.
- 1 13. The process recited in Claim 1, wherein said molecular sieve is an
2 aluminosilicate zeolite or a metallosilicate substantially free of aluminum.
- 1 14. The process recited in Claim 1, wherein said molecular sieve is a large
2 pore size molecular sieve or an intermediate pore size molecular sieve.
- 1 15. The process recited in Claim 1, wherein said molecular sieve is of a
2 structure type selected from the group consisting of LTL, FAU, MOR,
3 *BEA, MFI, MEL, MTW, MTT, MFS, FER, and TON.
- 1 16. The process recited in Claim 1, wherein said molecular sieve is selected
2 from the group consisting of zeolite A, zeolite L, zeolite X, zeolite Y,
3 mordenite, zeolite beta, ZSM-5, ZSM-11, ZSM-22, ZSM-35, silicalite 1
4 and silicalite 2.
- 1 17. The process recited in Claim 16, wherein said crystalline molecular sieve
2 is a ZSM-5 or silicalite 1.
- 1 18. The process recited in Claim 1, wherein said mesoporous inorganic
2 material is selected from the group consisting of silica, aluminum silicate,
3 and alumina.

- 1 19. The process recited in Claim 18, wherein the mesoporous inorganic
2 material is amorphous silica or amorphous silica-alumina having a specific
3 surface area exceeding 200 m²/g.
- 1 20. The process recited in Claim 1, wherein said porous organic ion exchanger
2 is removed by either an oxidation process or by dissolution.
- 1 21. Macrostructures prepared by a process comprising the steps of
2 (a) forming a composite material composed of a porous organic ion
3 exchanger having a three-dimensional pore structure and a
4 continuous matrix of a mesoporous inorganic material within the
5 three-dimensional pore structure of the porous organic ion
6 exchanger; and
7 (b) removing the porous organic ion exchanger from the composite
8 material to yield the macrostructures
9 (c) treating said continuous three-dimensional matrix of mesoporous
10 inorganic material, before or after removal of said porous organic
11 ion exchanger from the composite material, under hydrothermal
12 conditions to convert at least a portion of said mesoporous
13 inorganic material to a crystalline molecular sieve composition.
- 1 22. The macrostructures of Claim 21, wherein in the process the step of
2 treating said continuous three-dimensional matrix of mesoporous inorganic
3 material under hydrothermal conditions is conducted in the presence of a
4 structuring agent to convert at least a portion of said porous inorganic
5 material to a crystalline molecular sieve composition. .

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- 1 23. The macrostructures of Claim 21, wherein in the process the step of
2 treating under hydrothermal conditions occurs before the step of removing
3 the porous organic ion exchanger from the composite material.
- 1 24. The macrostructures of Claim 21, wherein in the process the step of
2 treating under hydrothermal conditions occurs after the step of removing
3 the porous organic ion exchanger from the composite material.
- 1 25. A process for converting hydrocarbons comprising contacting a
2 hydrocarbon feedstream under hydrocarbon conversion conditions with a
3 catalyst having macrostructures comprised of a crystalline molecular sieve
4 composition prepared by a process comprising:
5 (a) forming a composite material composed of a porous organic ion
6 exchanger having a three-dimensional pore structure and a continuous
7 matrix of a mesoporous inorganic material within the three-dimensional
8 pore structure of the porous organic ion exchanger; and
9 (b) removing the porous organic ion exchanger from the composite
10 material to yield the macrostructures
11 (c) treating said continuous three-dimensional matrix of mesoporous
12 inorganic material, before or after removal of said porous organic ion
13 exchanger from the composite material, under hydrothermal conditions to
14 convert at least a portion of said mesoporous inorganic material to a
15 crystalline molecular sieve composition.
- 1 26. The process recited in Claim 25, wherein the step of treating said
2 continuous three-dimensional matrix of mesoporous inorganic material
3 under hydrothermal conditions is conducted in the presence of a

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4 structuring agent to convert at least a portion of said mesoporous inorganic
5 material to a crystalline molecular sieve composition.

1 27. The process recited in Claim 25, wherein the step of treating under
2 hydrothermal conditions occurs before the step of removing the porous
3 organic ion exchanger from the composite material.

1 28. The process recited in Claim 25, wherein the step of treating under
2 hydrothermal conditions occurs after the step of removing the porous ion
3 organic exchanger from the composite material.

1 29. The process recited in Claim 25, wherein said macrostructures have a size
2 and shape of the three-dimensional pore structure of said porous organic
3 ion exchanger.

1 30. The process recited in Claim 29, wherein said porous organic ion
2 exchanger is a porous organic anionic ion exchanger.

1 31. The process recited in Claims 25, wherein the hydrocarbon conversion
2 process is selected from the group consisting of cracking of hydrocarbons,
3 isomerization of alkyl aromatics, transalkylation of aromatics,
4 disproportionation of alkyl aromatics, alkylation of aromatics, reforming of
5 naphtha to aromatics, conversion of paraffins and/or olefins to aromatics,
6 and conversion of oxygenates to hydrocarbon products.

1 32. The process recited in Claim 25, wherein said hydrocarbon conversion is
2 carried out at conditions comprising a temperature of from 100°C to

3 760°C, a pressure of 0.1 atmosphere to 100 atmospheres, a weight hourly
4 space velocity of from 0.08 hr^{-1} to 200 hr^{-1} .